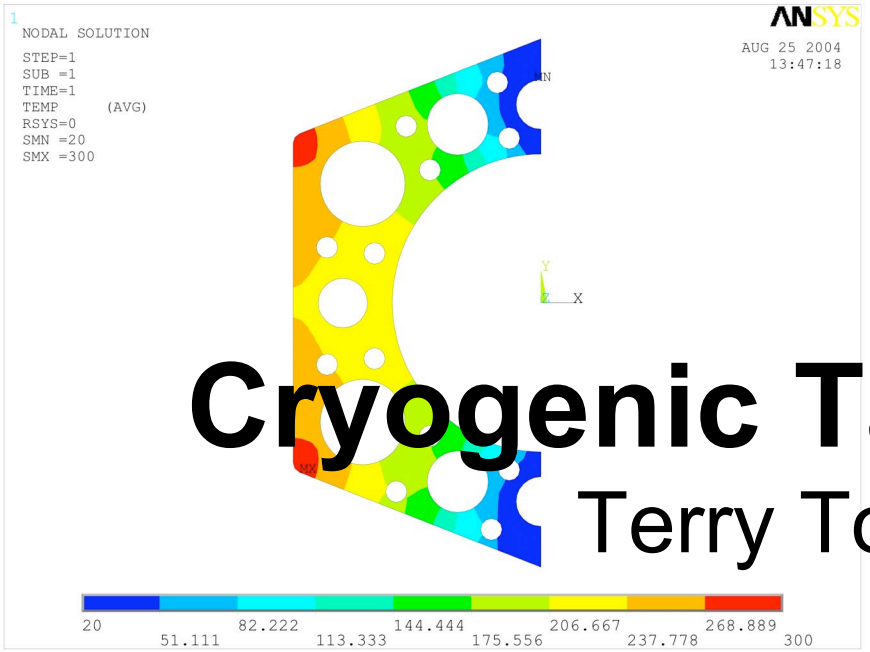
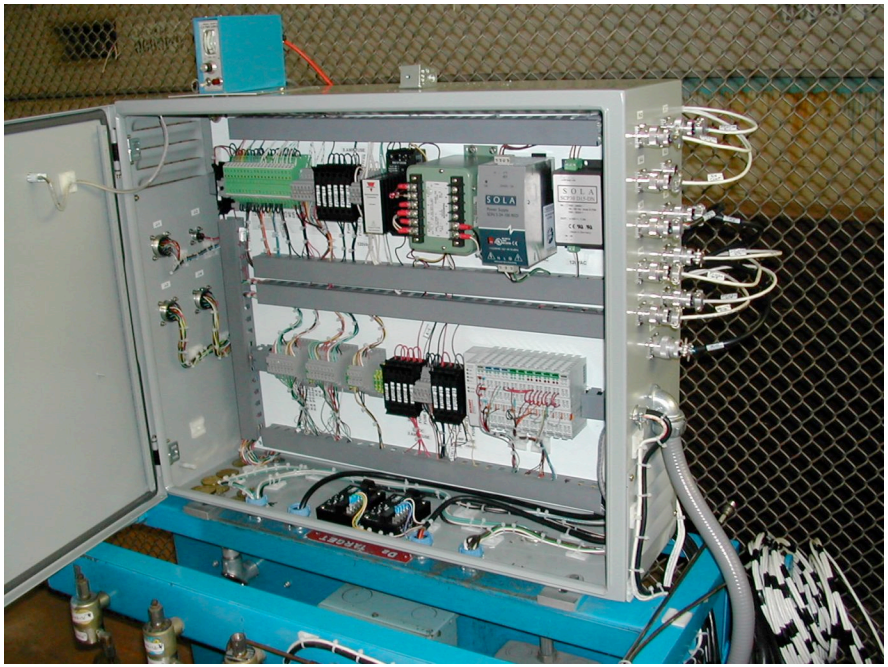
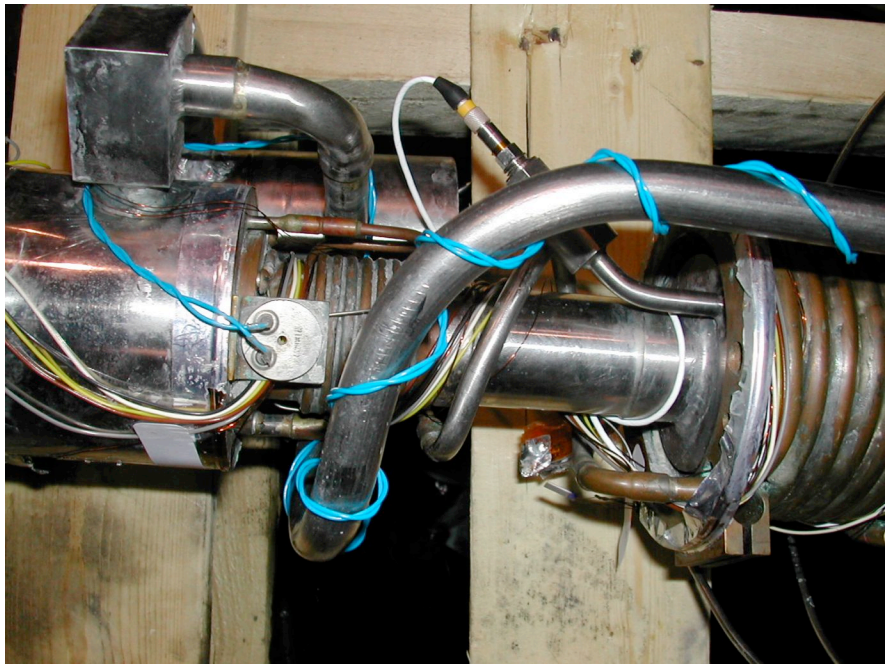


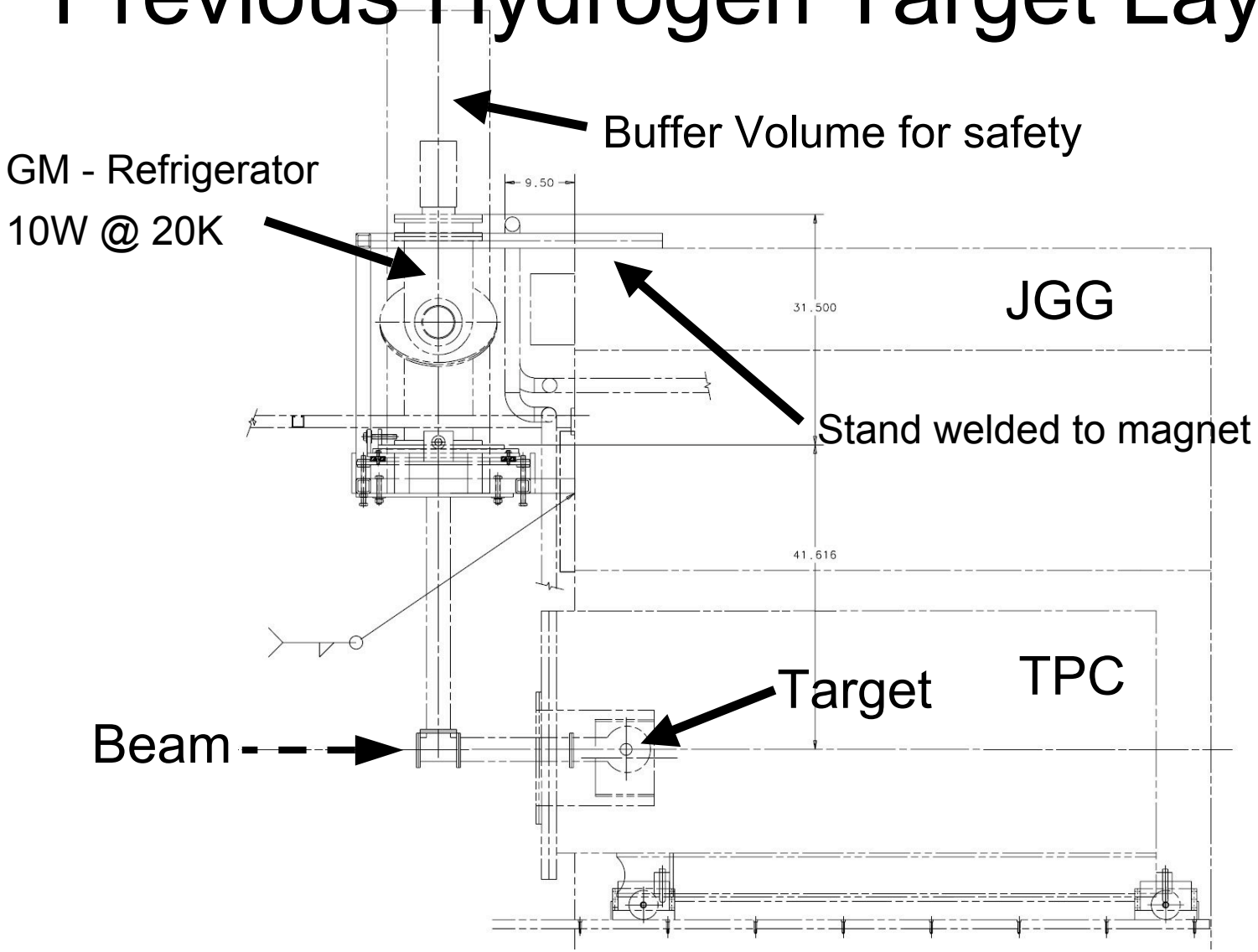
Cryogenic Target Upgrade

Terry Tope 4.28.07

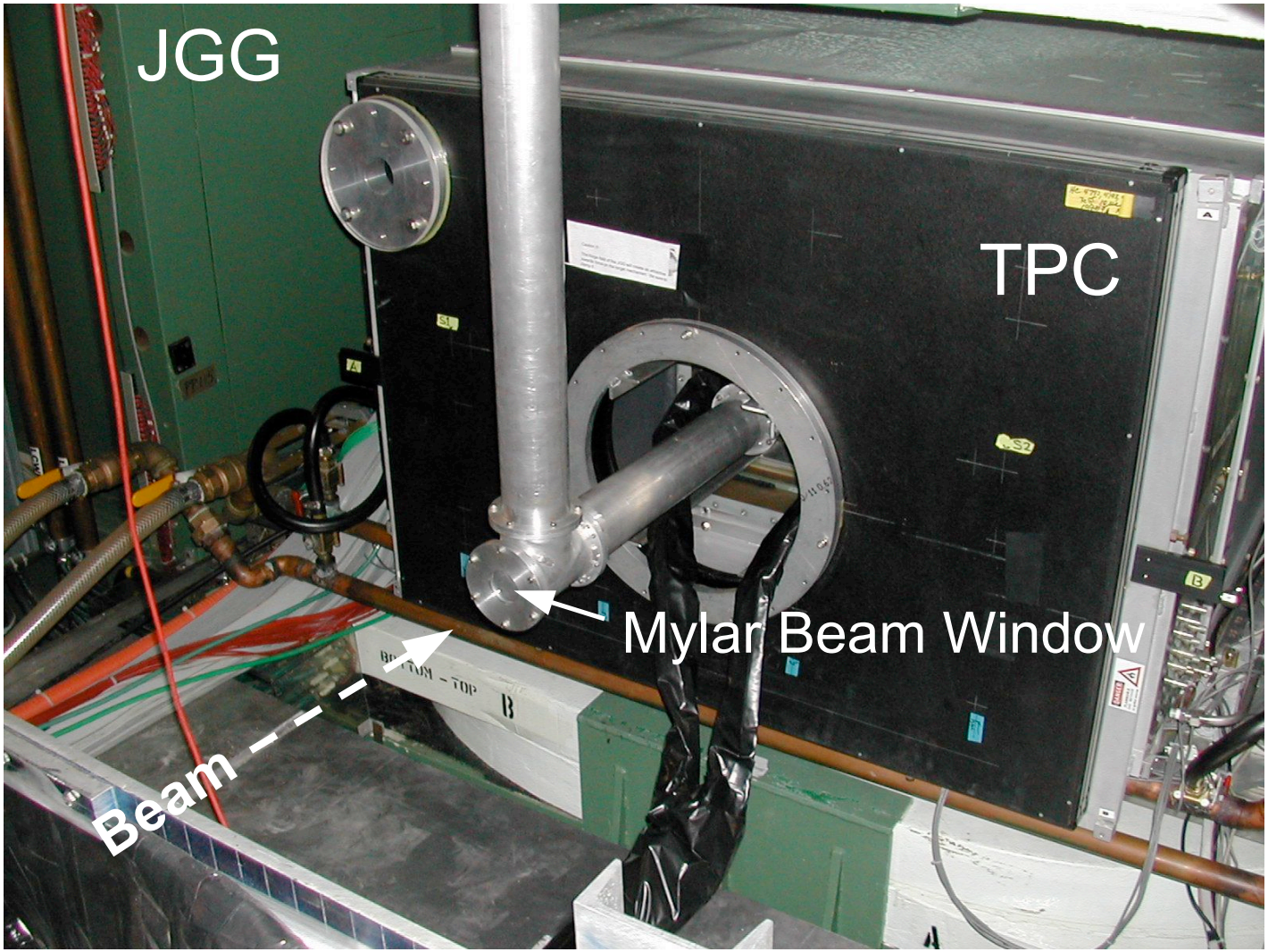




Previous Hydrogen Target Layout



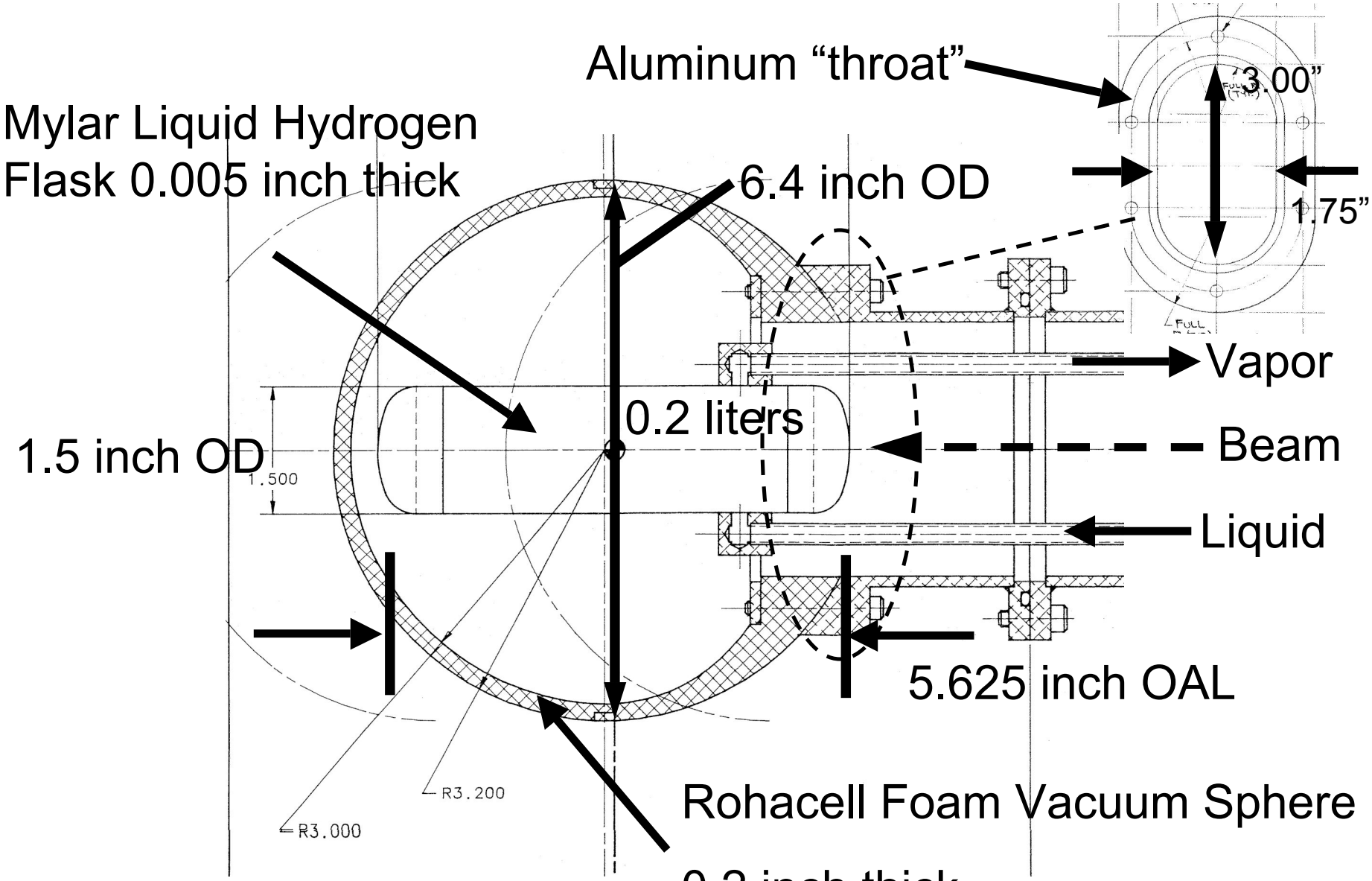
Previous Hydrogen Target Inside TPC



Previous Hydrogen Target Layout

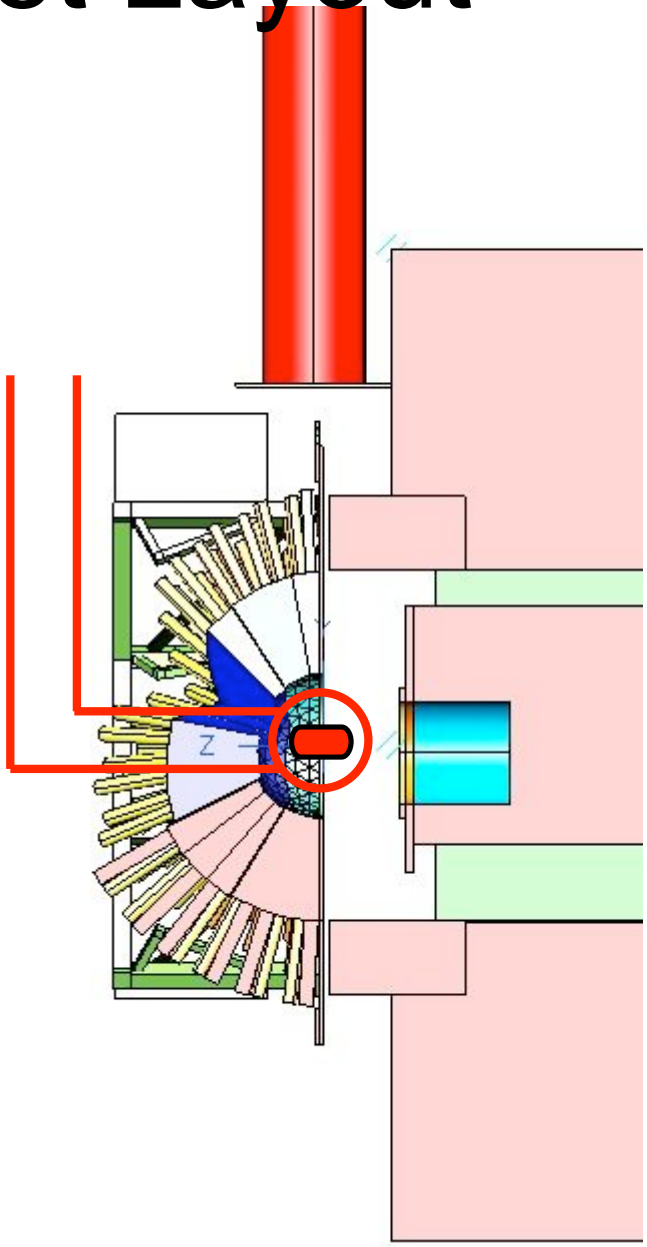
Previous Hydrogen Target Layout

Existing Hydrogen Flask & Vacuum Sphere



New Hydrogen Target Layout

- Issues
  - Flask location?
  - Minimum “throat” area for beam?
  - Low mass vacuum shell
    - Current OD > 5.5” plastic ball aperture, OK for 10” aperture
    - Change shape to fit thru ball aperture?
      - Cylinder wall 2x thick as sphere
  - Where to mount refrigerator?
    - Magnet face or plastic ball structure?
    - How to align target?
    - Possible to run flex lines so target can move with plastic ball independent of refrigerator to move out of beam
    - Large buffer tank can be mounted remotely with a hose connection
    - Do we care about vibration?
  - Safety with HV in the area



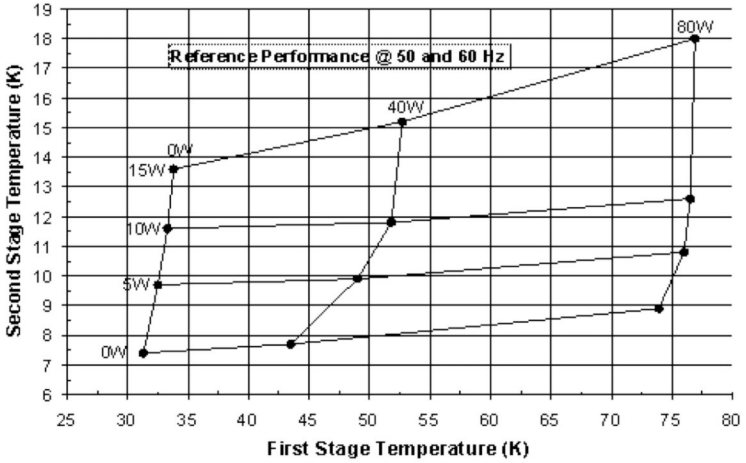
Target Upgrade

- Purchase new cryocooler
  - Current cryocooler is 20+ years old
  - New cryocooler offers improved reliability, 20k hours until first maintenance
  - Automation of manual adjustments
  - Ability to use cryocooler for N2 target using same fluid circuit as H2 by crippling cryocooler with heaters

14 W @ 20K

80 W @ 80 K

Cryomech pulse tube cryocooler



~$36k for total package, 14 week delivery